A Multi-Mission Operations Strategy for Sequencing and Commanding

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Abstract - The Telecommunications and Mission Operations Directorate (TMOD) of the Jet Propulsion Laboratory is responsible for development, maintenance and operation of flight operations systems for several classes of science missions planned for the next several years. The Mission Services and Applications (MS&A) Service System is responsible for a large group of operations tasks, most of which are oriented toward the uplink leg of flight operations. These include sequence and command processing, flight engineering tasks such as spacecraft resource planning, mission planning, telecommunications planning and DSN resource scheduling and planning. In addition, MS&A is responsible for the software tools necessary for performing these functions.

The mission classes mentioned in the preceding paragraph are of the following four types. Shared operations class missions are characterized by the similarity and simplicity of their operational strategies. Most of these types of missions involve routine activities by both a spacecraft and its ground support teams. Another class of missions are those which will use the developing Mission Data System, a flight and ground operations system which will permit greater operations flexibility by developing multi-mission operations tools. A third type of mission is observatories. Examples of this class of mission would include SIRTF and SIM and would be characterized by heavy use of early observation planning and rapid turnaround flight sequence generation. Finally, the fourth class of missions involve mobile vehicles and sample returns. Operations for this mission type is planned for use beginning in 2001 and is currently in early development.

The various mission classes have operational requirements, which are in many ways similar but differ sufficiently from one another to warrant development of a different type of operations strategy for each. Each of these operations strategies uses a standard set of tools developed by TMOD. A sequencing operations organization under the auspices of the MS&A is now being built that will be responsible for the sequencing and commanding aspects of flight operations for all missions that subscribe to its services, including personnel, computer hardware and software, procedures and interfaces.

This paper will describe the various mission types projected through the year 2006. It will then describe how TMOD/MS&A is planning to accommodate these missions operationally by providing a multi-mission sequencing and commanding capability which will be accessible to both new and existing missions. Finally, the projected resource savings and increases in efficiency will be discussed.

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